

Appl. No. 10/669,970
Amdt. Dated June 7, 2006
Reply to Office Action of March 17, 2006

•• REMARKS/ARGUMENTS ••

The Official Action of March 17, 2006 has been thoroughly studied. Accordingly, the following remarks are believed to be sufficient to place the application into condition for allowance.

Claim 1-10 are pending in this application.

Claims 1-10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Japanese reference No. JP 2003-183443 to Abe et al. in view of U.S. Patent Application Publication No. 2003/0077465 to Boudouris et al. The Examiner notes that U.S. Patent No. 6,870,002 to Abe et al. is and English language equivalent to JP 2003-183443 and will be used for translation purposes.

The Examiner has relied upon Abe et al. as teaching:

...a rubber composition, which comprises 100 parts by weight of a rubber mixture consisting of 70-95 wt.% of solid rubber and 30-5 wt.% of liquid rubber reactive on the solid rubber, and 450-1,000 parts by weight of magnetic powder. As the solid rubber, nitrile rubber (NBR), acrylic rubber (ACM), ethyl acrylate-ethylene copolymer rubber (AEM), ethylene-propylene copolymer rubber (EPDM), fluororubber (FKM), etc, may be used, according to the desired application.

The Examiner takes the position that:

Since applicant's ethylene methyl acrylate rubber differs from ethylene ethyl acrylate rubber of the JP reference only in that it is the next adjacent homologue, the use of

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the former would have been obvious to one of ordinary skill in the art at the time of applicant's invention

The Examiner will note that the inventive entity of JP 2003-183443 and U.S. Patent No. 6,870,002 are the same as the inventive entity of the present application.

Accordingly, the present inventors are very familiar with these prior art references and can distinguish the present invention over these reference as follows:

Initially it is noted that applicants' independent claim recite an "ethylene-acrylate copolymer rubber" in the open language of "comprises."

As the Examiner is no doubt aware, ethylene-acrylate copolymer rubber is a solid rubber component which applicants combine with a magnetic powder and vulcanize using an amine-based vulcanizing agent.

Abe et al. (JP 2003-18343) teaches a rubber composition that comprises 70-95 wt.% of a solid rubber and 30-5 wt.% of a liquid rubber.

Solid rubbers disclosed by Abe et al. include: "nitrile rubber (NBR), acrylic rubber (ACM), ethyl acrylate-ethylene copolymer rubber (AEM), ethylene-propylene copolymer rubber (EPDM), fluororubber (FKM), etc."

Liquid rubbers disclosed by Abe et al. include: "liquid NBR, liquid EPDM, liquid FKM, etc."

At column 1, lines 62-65 Abe et al. teaches that:

The liquid rubber reactive on the solid rubber is a liquid rubber having the same structure as or similar structure to that of the solid rubber and being cocross-linkable with the same vulcanizing agent as for the solid rubber.

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Abe et al. teaches ethylene ethyl acrylate rubber (EEA).

Applicants use ethylene methyl acrylate rubber (EMA).

Ethylene ethyl acrylate rubber (EEA) and ethylene methyl acrylate rubber (EMA) have distinguishing properties, characteristics and applications.

Attached as Exhibit A is a slide from a presentation by Professor Joe Greene (found at www.csuchico.edu/~jngreene/itec041/m41_ch09/m41_ch09.ppt).

This slide sets forth the differences in properties and applications of Ethylene ethyl acrylate rubber (EEA) and ethylene methyl acrylate rubber (EMA).

The Examiner concedes that Abe et al. does not teach ethylene methyl acrylate rubber (EMA).

Nevertheless, the Examiner takes the position that "Applicant's ethylene-methyl-acrylate copolymer differs from the ethylene methyl-acrylate copolymer of Abe et al only in that it is the next adjacent homologue and is therefore considered to be an obvious variant."

The Examiner's position is not sufficient to establish obviousness under 35 U.S.C. §103.

First, as noted above, ethylene ethyl acrylate rubber (EEA) and ethylene methyl acrylate rubber (EMA) have distinguishing properties, characteristics and applications, so that it cannot be said that they are equivalent substitutes of each other.

Second, applicants have provided working examples in their specification which show improved results when using ethylene methyl acrylate rubber as compared to nitrile rubber which is used in the working examples of Abe et al.

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Applicants' examples establish improvements associated with the use of ethylene methyl acrylate rubber which are unexpected, particularly in view of the fact that Abe et al. does not teach ethylene methyl acrylate rubber and because the ethylene ethyl acrylate rubber used by Abe et al. has not been shown to be equivalent to ethylene methyl acrylate rubber.

Further, applicants have discovered that the use of ethylene methyl acrylate copolymer rubber allows for a higher loading of magnetic powder. And that when an amine vulcanization system is used with an amount of 500 parts by weight or more of magnetic powder, the development of foam (possible with peroxide based vulcanization systems) is avoided.

Thus, applicants' claimed combination of ethylene methyl acrylate copolymer rubber and an amine-based vulcanizing agent are not at all disclosed or obvious over the prior art of record.

Note, Abe et al. fails to specifically teach amine-based vulcanization agents or their advantage (or selection) over peroxide-based vulcanization agents which applicants alone have found to be important for purposes of incorporating higher levels of magnetic powder into the resulting molded magnetic encoders.

In view of the fact that Abe et al.:

- 1) Fails to teach ethylene methyl acrylate copolymer rubber;
- 2) Fails to teach that ethylene ethyl acrylate copolymer rubber and ethylene methyl acrylate copolymer rubber are functional equivalents (even though Exhibit A indicates otherwise);
- 3) Discloses working examples over which applicants' magnetic rubber compositions have distinguishing properties and characteristics; and

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4) Fails to teach any specific vulcanization agent, let alone improvements and advantages associated with applicants' selective use of amine-based vulcanization agents,

...it cannot be said or established that applicants' claimed invention is obvious over the teachings of Abe et al.

This does not even take into account that the present inventors are the same as those of Abe et al. and did not "invent" the present invention at the time of Abe et al., but only afterwards.

If the inventors of Abe et al. did not realize the present invention at the time of Abe et al., how can it be said that the invention is obvious to those skilled in the art at the time of Abe et al.?

It is further noted that the composition of the present invention has excellent properties such as water resistance and saline water resistance, which can not be achieved in the case which NBR is found in all the working examples of Abe et al.

This allows the composition of the present invention to be used to produce molded products that are useful as rubber magnets for sensors (encoders for detecting revolution of crank and cam shafts) for driving systems around or near engines where heat resistance at high temperatures of 130 - 170°C are common (NBR can not meet such a requirement) or rubber magnets for wheel speed sensors that are exposed to harsh, wet and muddy environments.

The Examiner has relied upon Boudouris et al. as disclosing compositions that comprise magnetic materials such as ferrites, rare earth-cobalt magnets of one or more of the rare earth elements such as Sm or Pr, yttrium (Y), lanthanum (La), cerium (Ce), or other magnetic materials including, for instance, manganese-bismuth and manganese-aluminum.

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The Examiner further relies upon Boudouris et al. as documenting "that ethylene methyl acrylates and ferrites are conventionally used in rubber compositions having magnetic properties.

In combining the teachings of Abc et al. and Boudouris et al. the Examiner take the position that:

The use of these compositions [of Boudouris et al.] in the JP invention would have been obvious to one of ordinary skill in the art at the time of applicant's invention

Boudouris et al. describes a composition in which magnetic filler is provided in a high mixing proportion in a thermoplastic elastomer. Boudouris et al. teaches that rubber can be used instead of the thermoplastic elastomer. Ethylene methyl acrylate is listed as an example.

Boudouris et al. fails to provide any description as to the excellent properties that can be achieved by the use of ethylene-methyl acrylate copolymer rubber.

In this regard, it is noted that Boudouris et al. is directed to "methods and compositions for making magnetic, printable assemblies that will self-adhere to a magnetically attracted surface.

In paragraph [0004] Boudouris et al. teaches:

A popular application of such materials is thin, flat magnets having on their outer surface a decorative pattern and/or promotional information, including advertisements in direct mailings, newspaper inserts, and so forth, box toppers, coupons, business cards, calendars, greeting cards, postcards, and so forth.

In paragraph [0005] Boudouris et al. teaches:

These magnetic pieces may then be placed on a magnetically attracted surface such as a refrigerator, file cabinet, or other surface where they may be used as reminders and are often used to hold sheets of paper such as notes, recipes, lists, children's artwork, reminders, and so on.

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Clearly Boudouris et al. is unrelated to the field of encoders and speed sensors so that Boudouris et al. does not overcome or cure the fact that applicants' compositions produce unexpected results as compared to Abe et al.

Moreover, as in the case of Abe et al., Boudouris et al. fails to specifically teach amine-based vulcanization agents or their advantage (or selection) over peroxide based vulcanization agents which applicants alone have found to be important for purposes of incorporating higher levels of magnetic powder into the resulting molded magnetic encoders.

The Examiner's position that the "teachings of Abe et al. is not limited to the components in the working examples" is noted.

However, it is pointed out that Abe et al. fails to teach specific rubber component claimed by applicants either in the working examples or elsewhere. The working examples have been relied upon as establishing the properties and characteristics of the composition of Abe et al. over which applicants' present invention is patentably distinguishable.

Thus, applicants' reliance upon the working examples in Abe et al. is appropriate.

Based upon the above distinctions between the prior art relied upon by the Examiner and the present invention, and the overall teachings of prior art, properly considered as a whole, it is respectfully submitted that the Examiner cannot rely upon the prior art as required under 35 U.S.C. §103 to establish a *prima facie* case of obviousness of applicants' claimed invention.

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It is, therefore, submitted that any reliance upon prior art would be improper inasmuch as the prior art does not remotely anticipate, teach, suggest or render obvious the present invention.

It is submitted that the claims, as now amended, and the discussion contained herein clearly show that the claimed invention is novel and neither anticipated nor obvious over the teachings of the prior art and the outstanding rejection of the claims should hence be withdrawn.

Therefore, reconsideration and withdrawal of the outstanding rejection of the claims and an early allowance of the claims is believed to be in order.

It is believed that the above represents a complete response to the Official Action and reconsideration is requested.

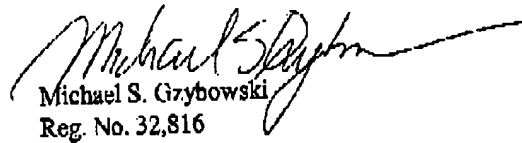
If upon consideration of the above, the Examiner should feel that there remains outstanding issues in the present application that could be resolved, the Examiner is invited to contact applicants' patent counsel at the telephone number given below to discuss such issues.

To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge the fees due in connection with the filing of this paper, including extension of

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time fees, to Deposit Account No. 12-2136 and please credit any excess fees to such deposit account.

Respectfully submitted,


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151335.1



Elastomeric (Rubber) Material

Professor Joe Greene
CSU, CHICO

Copolymers of Polyethylene

- Ethylene-ethyl acrylate (EEA)
 - Properties range from rubbery to tough ethylene-like properties
 - Applications include hot melt adhesives, shrink wrap, produce bags, bag-in-box products, and wire coating.
- Ethylene-methyl acrylate (EMA)
 - Produced by addition of methyl acrylate monomer (40% by weight) with ethylene gas
 - Tough, thermally stable olefin with good elastomeric characteristics.
 - Applications include food packaging, disposable medical gloves, heat-sealable layers, and coating for composite packaging

